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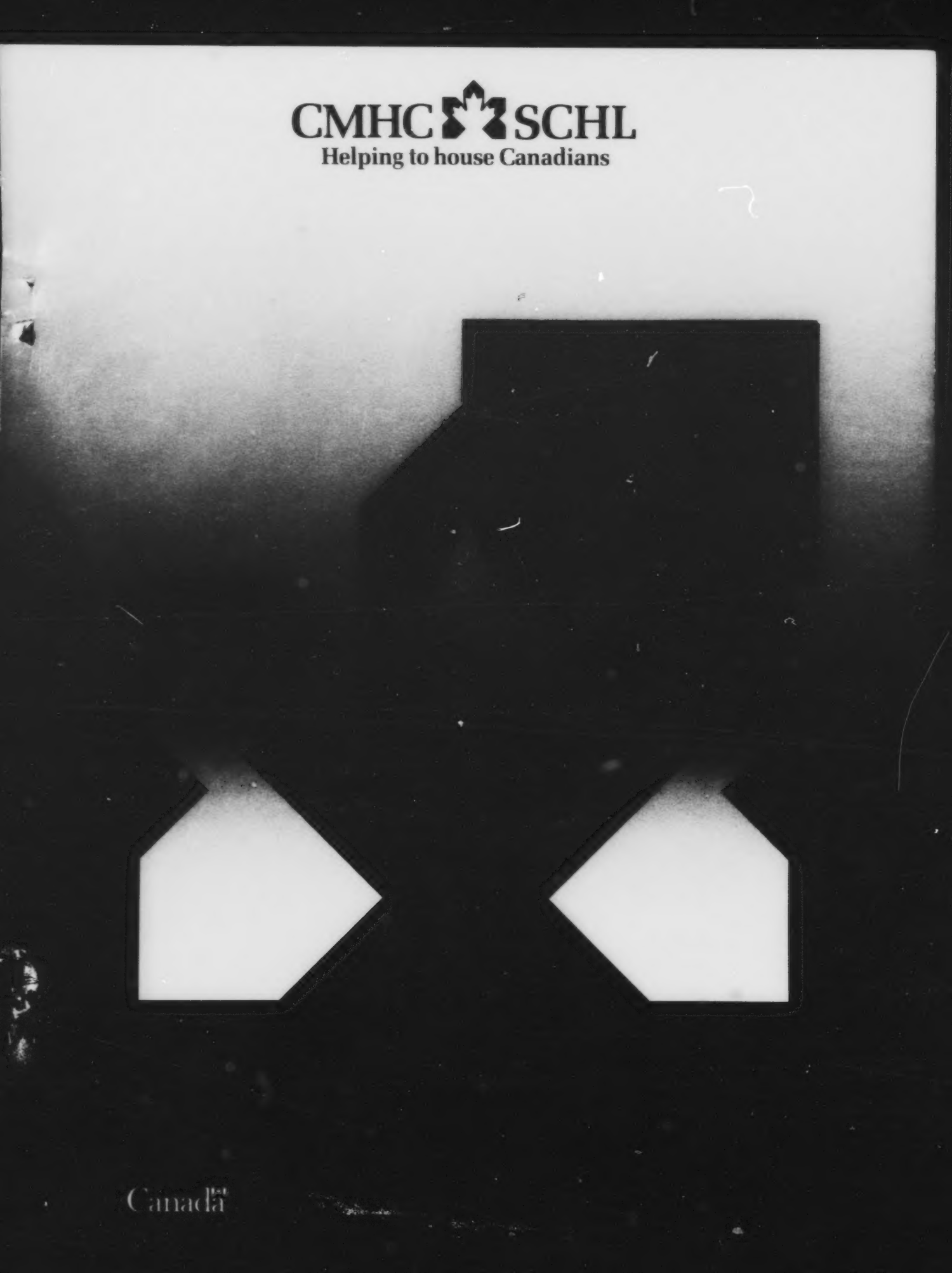

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PROCEEDINGS OF

GLOBE '90

URBAN DEVELOPMENT STREAM

GLOBE '90 was the first international Trade Fair and Conference in the GLOBE series. GLOBE'92 will be held in Vancouver, British Columbia, Canada, from March 16 - 20, 1992. It is a cooperative venture of Major Event Management Inc. and the Government of Canada, with major sponsorship from the host province of British Columbia. GLOBE'92 is supported by Canada's Green Plan.

CANADA'S GREEN PLAN
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GLOBE '90

Global Opportunities For Business and the Environment

Opportunités mondiales pour l'entreprise et l'environnement

PROCEEDINGS OF THE URBAN DEVELOPMENT STREAM OF GLOBE '90

March 19 - 23, 1990
Vancouver, British Columbia

PREPARED BY

CANADA MORTGAGE AND HOUSING CORPORATION

EXECUTIVE SUMMARY

The Urban Development Stream of GLOBE '90 stressed the need to integrate environmental, economic and social issues into decision making to ensure a quality of urban life, in both developed and developing countries, that "meets the needs of the present without compromising the ability of future generations to meet their own needs." This was the focus of all 10 sessions.

The stream also emphasized the roles of government, business and the community and in developing urban planning strategies which provide leadership and flexibility. Sessions in the urban development stream were divided into two topics: strategies for sustainable urban utilities; and sustainable urban areas.

Opening Plenary: Setting the Stage: Sustainable Development and the Urban Future

The panel members from this session identified the opportunities available to business, government and international organizations to promote a more sustainable environment.

The opening session defined and examined the links between urban development, the global environment and the opportunities for sustainable development. The keynote speaker, Jodi Jacobson, stressed the urgency of sustainable development by stating that environmental problems arising from cities are inextricably interconnected with social issues and with economic development. Jacobson concluded that the world as it now exists is not sustainable, because inequalities in the urban system limit the potential for economic and human growth. In contrast, A.U. Okali noted that modernization of Third World cities is key to sustainability. Economic growth is a vital prerequisite to a country's future prosperity and vitality. Thus, Okali did not see urban growth as inherently anti-environment, but rather as the most environmentally safe way to live if handled properly. He said we should not try to eliminate urban development, but its undesirable aspects instead.

In separate presentations Sallyanne Atkinson and John Mayberry endorsed the collaborative approach to sustainable development. Atkinson's presentation used the developments in Brisbane to underscore the importance of civic leaders, particularly in their role as a facilitators for change. But she also noted the importance of regional differences that make a blueprint for success impossible. Trial and error, not scientific research, is the only method of achieving a sustainable city. John Mayberry's presentation showed the benefits derived, both

locally and nationally, from collaboration among Dofasco, the community of Hamilton and the city of Hamilton.

STRATEGIES FOR SUSTAINABLE URBAN UTILITIES

Session 2: Towards a Waste-Free City

Session 2 examined the implications of achieving a waste-free city via efficient urban waste management systems. The session also explored practical recommendations for attaining the goal.

Speakers from the first subsession outlined the steps taken in different countries to achieve a waste-free city. Howard Levenson identified recycling and reduction measures in the United States as effective programs which educate the public. Hidenbou Ogasawara's comments on Japanese waste disposal were similar to Levenson's views. Japanese measures that seek to reduce municipal waste through government regulations have not been as effective as policies which educate and actively involve the public (ie. source separation and group collection). The Japanese experience shows that effective waste reduction is a cooperative venture which balances comprehensive legislation and community group activities. Citing examples of traditional Asian cities as waste-free models, Christine Furedy said that a waste-free city will not

be possible in developing countries if modernization persists on its present course.

The second subsession covered technologies, services and programs which promote the reduction of municipal solid waste. The Blue Box System, presented by Derek Stephenson, proved to be a successful waste reduction program in North America. Through active participation, the system educates society about the consequences of waste production. Another waste reducing process which is gaining favour in North America is composting. According to Glenda Gies and Paul Manley, the widespread public acceptance of composting is attributable to improvements to the composting method. Shelagh Kerr provided a different perspective in her presentation of various packaging options. Waste from packaging accounts for a large percentage of total municipal solid waste. Exercising different packaging options is one way to reduce solid waste in our cities. However, consumers must change their attitudes and behaviour in order to spark changes to the packaging of products.

Session 3: Provision of Clean Water

The session on clean water addressed two issues associated with potable water: 1) the problems of maintaining a potable water supply in an area of large population, extensive industry, agriculture and multiple jurisdiction; and 2) innovative approaches to handling potable water supply and demand.

The first subsession focused on the Great Lakes area, presenting the potable water issue from the perspective of government, industry and non-governmental interest groups. The general conclusion among the speakers was that environmental issues in general, and the Great Lakes issue in particular, have no political boundaries or jurisdiction. Strategies developed to ameliorate environmental problems must include all stakeholders of adjacent urban settings. Barry Wellar, presenting the perspective of a non-governmental organization, called for new laws and regulations which promote a healthy ecosystem.

Robert Welch provided the intergovernmental perspective, advocating coordinated and comprehensive strategies involving all levels of government, the public and the business sector. He urged them to adopt a new ethic which merges economic, environment and social priorities. Attitudinal, ethical, institutional and behavioral change are essential to achieve a clean water supply. George Werezak, from Dow Chemical, echoed this sentiment by stressing the need for government, business and the community to develop effective and sustainable potable water supplies. Sustainable development from Werezak's view involves commitment, change and communications.

The second subsession under "Provision of Potable Water" featured technical presentations on innovative approaches to handling potable water supply and demand in developing and developed countries. The first speaker, Allen Livingston,

reviewed the emerging trends in water quality standards and their impact on water treatment processes in developed countries. The goal of safe drinking water is sparking more activity, especially the study, design and construction of water treatment facilities.

The last two speakers focused on water treatment facilities. Kim Choate and Michael McGarry presented local case studies in their examinations of water supply for communities in Tennessee and San Salvador, respectively. Kim Choate found that, for smaller communities, constructed wetlands were a feasible option, rather than more expensive, technologically advanced water treatment facilities. These were much too expensive to operate in small communities. Michael McGarry's presentation of San Salvador demonstrated why locally based solutions are important. He stressed that solutions to safe drinking water problems must come from within the community, in conjunction with government leadership. Safe drinking water is the goal of every community and should be actively pursued through cooperation among the public, private and community sectors. However, policies, programs and specific projects must be flexible enough to allow for regional differences and local solutions.

Session 4: Energy Costs of Urban Living

This session looked at reducing urban energy consumption through renewable and environmentally benign energy sources. Robert Tamblyn identified buildings as the principal culprit in energy waste in urban areas of developed countries. To rectify this, Tamblyn advocated the three R's of energy management: review, retrofit and recommission. Tom Parkinson said that more innovative methods are needed to control or reduce the energy used for urban transport. As the popularity of the automobile increases, so too does the level of pollutants in the atmosphere. Five principal methods advanced by Parkinson to reduce the energy used for urban transportation are: substituting communications for commuting, reducing commute distances, producing higher vehicle energy efficiency, promoting the use of alternative fuels and promoting transit usage.

Davindar Lamba, representing the view from the developed world, pointed out the ramifications of energy use for the general health of a population. He described a cooking fuel crisis which not only affects the health of the citizens, but also the sustainable qualities of the city, since surrounding forest reserves are depleted in the quest for fuel wood.

Overall, the speakers supported a change in attitudes. They acknowledged that energy sources are finite. We therefore need

to reduce consumption of fossil fuel, either by developing more environmentally benign fuel sources or through better conservation methods. Linda Krugel's case study of Portland's energy plan presents one way to achieve this. The Portland plan addresses new sources of energy, strategies to be more energy-efficient, and environmental issues at the local level.

Session 5: Environmentally Friendly Transportation

The fifth session offered ideas for making urban transportation systems consistent with sustainable development policies. Throughout the Urban Development Stream, transportation was repeatedly identified as an area requiring major change. The consensus among speakers in this session was that the popular mode of transportation, the automobile, was the root problem. Richard Soberman was concerned about the promotion of the automobile as the principal mode of travel. He suggested reducing automobile travel through land-use intensification, the implementation of appropriate technology, equitable pricing, traffic management, open planning and a return to professionalism.

Sonia Litz viewed the problem of transportation in a megalopolis as symptomatic of population intensification. She said that industry has an important contribution to make in achieving a new kind of energy for automobile travel. Robert Chapleau analyzed transportation via origin-destination

equations and identified demographic change as an important element in the transportation issue. In his view, many of the problems associated with urban transportation are rooted in the relative lack of adequate land and inadequate road pricing. Southern California's Regional Mobility Plan, presented by Pat Russell, attempted to address the problems associated with urban transportation through four strategies: growth management, transportation demand management, systems management and facilities development. The goal of the Plan is to achieve an efficient balance among all transportation modes, thereby ensuring a more "environmentally friendly" transportation network.

SUSTAINABLE URBAN AREAS

Session 2: Planning Better Urban Space

Session 2 addressed the concept of planning better urban space from environmental, economic and social perspectives. The panel discussion that ensued revolved around the question, "What is better urban space?"

With the help of international examples, Peter Hall maintained that good urban space must look good, feel good and work well. William Teron argued that good urban space must be designed to enhance the human potential and spirit, and that it can be achieved via a planned process. Teron took issue with the

speculative process, saying it does not promote this type of positive development. In his case study of Melbourne, Lyndsay Neilson found that quality of urban space can be greatly improved by increasing residential opportunities in established urban areas as opposed to the fringe.

The second subsession provided some practical strategies for developing better urban space. Andrew Maskrey's accounts of squatter settlements in Lima showed Villa El Salvador to be a leader in translating community concerns into more habitable urban space. The success of this community lies in the strength of the community organization. Self-management administered by a community organization has produced remarkable results in the absence of financial and technical resources. In his examples of development projects in Vancouver, Michael Geller asserted that new development is necessary to create a healthy economic climate. Only in such a climate can all sectors of industry try to upgrade the environment. Governments must therefore not hinder new development. The final speaker, Paul Greenhalgh, told of steps taken to develop a Multi-function Polis and the strategy to create better urban space for the future. The Multi-function Polis experiment showed how eager international investors are to support new environmental initiatives.

Session 3: Quality of Urban Life

The "Quality of Urban Life" session explored the interrelationships between quality of life issues and environmental concerns. Sigfried Brenke opened the session by outlining the importance of quality of life indicators in the decision-making process. He noted that environmental problems in cities are inextricably interconnected with social issues and economic development. Although Brenke advocated that cities conduct research on quality of life, he also urged that cities work cooperatively on this issue with other cities, with regional and national governments, and with international organizations. Jorge Hardoy pinpointed the need for major economic and institutional changes that address both environmental and social issues. Specifically, Hardoy said that sustainable development requires the elimination of poverty to create better living conditions for the poor and destitute.

Ensuring good quality of life also requires that all players involved in urban planning, management and implementation understand the nature of the problem, identify opportunities and develop effective strategies. Julius Miller outlined how a community organization in a Bombay slum was able to dramatically improve its quality of life, which would not have been possible without the organization. In Toronto, the quality of life has been improved via a Healthy Cities Office

that focuses on the physical, economic, social and cultural well-being of citizens.

The Rotterdam case study, presented by Len de Klerk, illustrated that strategies for comprehensive urban planning are essential. Strategic planning and management for any area requires leadership and flexibility to allow for the participation of the public, private and community sectors. Furthermore, decision-making strategies must integrate social, environmental and economic variables.

Session 4: Shelter and the Sustainable Community

This session explored the links between shelter and sustainable development, looking particularly at individual housing units and their integration into the larger community. Alan Redway pointed out that housing is integral to sustainable development, since it impacts the environmental, economic and social spheres. He called for the systematic integration of these components into development strategies which fully consider the implications at every level -- from individual dwelling, to neighbourhood, to city and to the system of cities. This statement was echoed in Stan Benjamin's presentation on San Salvador which showed that action to improve the environment must also improve the conditions for the urban poor. He illustrated the point with his example of Canadian International Development Agency efforts in San

Salvador to provide adequate housing for earthquake victims. Redway's sentiments were also reiterated in Elizabeth White's presentation on the Advanced House, the aim of which was to demonstrate new technologies and to change the attitudes of both builders and consumers.

The presentations by Locana Gunaratna and Wilson Orr on Sri Lanka and Tucson accentuated the need for partnerships between governments, business and all sectors of society, particularly community groups. The open planning process, integral to the development of the Tucson Solar Village, provided a communication link between the builder and the community. The process enabled effective identification of problems and community input to solutions.

Experiences in Sri Lanka illustrated the need for an alliance between the community and the government on housing and for the integration of housing into the national development strategy. Matthew Kiernan further stressed the importance of housing in the community. He illustrated how housing developments in Winnipeg, Toronto and Montreal strengthened the social, economic and physical fabric of the city through the use of shelter as a economic and social force to create a sustainable urban community.

Session 5: Environmentally Sensitive Decision Making

This session looked at how environmentally sensitive decisions are made. The first subsession involved a panel of senior government, environmental and industry representatives. The second subsession discussed the techniques and technologies necessary to implement environmentally sound urban management.

The keynote address by David Balsillie reiterated the need to maintain an ecological balance to the greatest extent possible. Balsillie said that attitudes are changing among corporate decision makers. He cited as examples round table discussions at the provincial and national levels involving municipal and business groups, and Ontario's multi-stakeholder approach to the regulation of waste-water discharges.

Speakers from the first subsession agreed that in order to ensure environmentally sensitive decisions, the community must participate at all levels of decision making. Raymond Robinson's accounts of the federal experience showed that there has not been enough external pressure to force the government to integrate the environment, economy and other factors into the decision-making process. It requires forces outside the normal realm of policy development to insist upon certain environmental norms.

Shimwaayi Muntemba spoke from a community perspective. She recognized that issues arise locally and build up to the national and international levels. Tim Page offered a business perspective, identifying the efforts of the Canadian Chamber of Commerce to enhance environmentally sensitive decision making among smaller businesses. Businesses of all types and sizes must play a part in a multi-stakeholder environment, he said.

The second subsession outlined the tools and technologies used to arrive at environmentally sensitive decisions. Surin Setamanit highlighted three separate developments in Thailand to show how environmental considerations were integrated into the planning, auditing and operational stages of each project. Ole Bjorkquist used a model to illustrate to decision makers the benefits and costs associated with environmentally-friendly decisions. Ann Smith outlined the review process implemented by Allied Signal to minimize impacts from the construction of an advanced laboratory. Much of the success of this project is due to a process which integrates a community perspective into the planning stage.

Session 6: Sustainable Development and the Urban Future

The final session consolidated the practical solutions presented in both streams and identified the opportunities for creating urban areas that consider both the environment and their inhabitants. The Stream rapporteur, Colin Isaacs,

highlighted the major points made by the speakers from each session and pointed out the interweaving of themes. The overriding conclusion, he said, was that cities are good places that can be made sustainable if, and only if, everyone works together -- the cities' people, municipal governments and businesses.

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INTRODUCTION

This report summarizes the sessions under the Urban Development Stream of the GLOBE 90 Conference/Trade Fair held March 19 - 23, 1990, in Vancouver.

The overall objective of the conference was to promote practical solutions to achieve sustainable development by identifying specific business opportunities. Promoting practical solutions requires a commitment from all levels of government, the private sector and non-government and community groups to work together. GLOBE '90 provided the opportunity to discuss business and the environment from a variety of perspectives. Urban development was one of these.

By the year 2010, half the global population is expected to live in urban areas. The character and shape of urban development will be influenced by, and will have a major influence on, the global environmental situation. For example, scientists have largely attributed global warming to carbon dioxide gases produced by the burning of fossil fuels in our cities. The challenge, in this case, is to identify methods to prevent such environmental destruction by making urban development and lifestyles more environmentally friendly.

Sustainable development incorporates environmental, economic and social elements. The urban development stream sought to address these and to identify the roles and responsibilities of the various "players" -- local, regional, national, and international -- in planning, managing and implementing urban development strategies. These objectives were achieved via two sections: strategies for sustainable urban utilities, and sustainable urban areas. The specific issues associated with the urban environment, and solutions to planning, were identified within each section. An opening plenary session set the context for the Urban Development Stream, while a closing plenary consolidated the practical solutions presented and the opportunities for creating liveable urban areas.

OPENING PLENARY

SETTING THE STAGE

SUSTAINABLE DEVELOPMENT AND THE URBAN FUTURE

Session Chair: George Ferguson
Mayor, District of Abbotsford
President, Federation of Canadian Municipalities

The opening session for the Urban Development Stream established the framework for the entire stream by defining and examining the links between urban development, the global environment and the opportunities for sustainable development.

The first speaker presented a worst case scenario by outlining the consequences that would result if sustainable development is not incorporated into the way we live. This was followed by a panel discussion identifying the opportunities available to business, government and international organizations to achieve sustainable development and a more "viable future."

The Future of Urbanization: Facing the Economic and Ecological Constraints

Speaker: Jodi Jacobson

Senior Researcher, World Watch Institute, Washington D.C., U.S.A.

Jacobson's presentation, "Today's Cities Are Not Sustainable" stressed the need to integrate sustainable development into the way people live in cities. Five prerequisites to sustainable development were identified:

1) The world must move quickly towards a sustainable society. This must be achieved within 40 years, otherwise environmental degradation and economic decline will precipitate social breakdown.
2) Our world must make better use of technology, which can play a vital role in a sustainable future. At present, most technological tools are underutilized.
3) To avoid major ecological damage, the world economy must shift away from fossil fuels to more environmentally benign energy sources. Reducing fossil fuel use will decrease CO_2 emissions. These must be cut down to one third of the present levels on a per capita basis worldwide.
4) World population growth must be reduced from present levels.
5) A more equitable and secure economy must be achieved.

Urban development has not progressed towards the above goals, and thereby towards a sustainable future. On the contrary, it has moved in the opposite direction. This is quite evident by the amount of waste generated in urban areas. Although cities accumulate much of a society's fiscal and natural resources, they also produce a great deal of waste. Such leading urban ecological issues as water scarcity, waste disposal, inefficient land and energy use are the result of the way people live in cities. Any economic gains which occur in urban areas are offset by inefficient use of natural and human resources.

Solving present urban ecological problems, and achieving a sustainable future, requires the use of sustainable practices. Individuals, business leaders and governments worldwide must adopt and promote more environmentally benign practices such as energy efficient technologies and intensify urban land uses. Equally important, individuals, business leaders and governments must address the inequities that limit the potential for economic and individual growth and that arise from present urban conditions.

Panel Discussions

Speaker: Sallyanne Atkinson

Lord Mayor, City Of Brisbane, Australia

Civic leaders can play a crucial role towards achieving or advancing a sustainable environment. Specifically, civic leaders must provide the leadership and direction in developing a manageable framework for sustainable development. This framework must be developed for and with the community. Making cities good places to live means making the best use of the available resources. It also means protecting the environment while optimizing the potential for progress and growth. The City of Brisbane has developed four proposals which reflect this approach. The proposals are to:

1) Develop a reliable data base of natural and man-made resources and the manner in which they interact.
2) Consult residents of the city and educate them about environmental issues.
3) Build a bureaucratic and administrative structure that is sensitive to the political aim of urban sustainability. In so doing, increase awareness within the council, the bureaucracy, the broader community and other levels of government about the impact of individual actions on the environment.
4) Integrate studies and community attitudes into the city's

strategic plan.

Over the last five years, Brisbane City Council produced twenty different studies on the natural and man-made assets and resources of the city. Many of these studies underline the complexity of environmental issues. For example, a study of a bushland area identified it as an area with a prime conservation value, while an industrial strategy study of the same tract of land identified it as a prime area for industry. The results from these two studies created an interesting dilemma and underlined the need for a systematic approach to planning and development.

There is no blueprint for a sustainable city. Trial and error, rather than scientific research, is the only way to achieve it. In striving towards this goal, one must keep regional differences in mind. What works well for one area may not necessarily be a viable solution for another. Municipal governments must provide leadership as they work with people from the community towards making cities liveable.

Speaker: A.U. Okali

Director, United Nations Centre for Human Settlements, New York, U.S.A.

Urbanization and modernization are critical to the development process of countries. Countries attain their highest level of

wealth when their populations have achieved an organized concentration. This is the essence of a city structure. Furthermore, the success of national economies depends on how well-tuned they are to the increasingly interdependent world economy and to international trade and finance. Banking and communications are critical to linking with the world economy, therefore cities need to develop structures which facilitate these processes.

Governments of Third World countries view cities as a vital component of the development strategy which they embrace -- a strategy of industrialization or modernization. Future national growth in developing countries depends on urban centres being able to perform crucial functions within the national economy and to spearhead development efforts. Far from being an obstacle to a sustainable future, urbanization and modernization are key to it.

Urban growth is not inherently anti-environment, nor is it in direct conflict with the rural environment. Cities can have good environmental records while still creating wealth and spurring economic development as well as social and cultural innovation. The fact that cities developing under similar conditions can have very different records on environmental issues proves that urban growth does not have to result in environmental destruction. Under certain conditions, urban concentration may be the most effective and environmentally sound way to live. Furthermore, urban centres boost the

economy of rural areas by providing employment and a market for rural goods.

We should aim to eliminate not urban development, per se, but rather the undesirable aspects of it. For example, modernization and urbanization may result in social inequity or the development of an urban underclass. But global political will and a large-scale commitment of technological and financial resources can overcome these problems. Developing countries need assistance (eg. debt relief) to achieve development objectives consistent with the concept of sustainable development.

Speaker: John Mayberry

President, Dofasco Steel, Hamilton, Canada

In the City of Hamilton, sustainable development is defined as cooperative efforts by government, industry and community to improve the environment. Hamilton is a model of successful private, public and voluntary sector teamwork to reduce the environmental impacts of day to day activities.

Dofasco Steel has shown long-term commitment to the environment through research and development efforts and through the use of technology that minimizes harm. For example, 1970 is considered a milestone for environmental initiatives at Dofasco Steel. This was the year the company decided to incorporate

the best available pollution abatement technology into its everyday activities to solve air and water pollution problems. Since 1970, Dofasco has spent more that half a billion dollars on air and water pollution equipment. Over the next six years, the company will commit a further $28 million to pollution control. This will occur in conjunction with the company's ongoing participation in many environmental initiatives such as the Blue Box recycling and other waste management programs. Such efforts have shown Dofasco to be an industry leader in the field of environmental protection.

Sustainable development presents many opportunities and responsibilities for various sectors of society. In the Hamilton area, the regional and city governments have co-existed for years with the steel industry, and this has promoted understanding of the other's goals and responsibilities with respect to the environment. As a result, all parties have been able to take advantage of joint responsibilities and available expertise. Dofasco has provided tax support, helped sustain the utilities and infrastructure of the city, and funded research at the Canada Centre for Inland Waters, a research centre into fresh water environmental impacts and controls.

The Hamilton experience has shown the need for three strategies: 1) encourage environmentally conscious values based on good science and technology; 2) maintain these values through standards, regulations and enforcement; and 3) promote

pricing of resources and commodities that factors in desirable behaviour. The corporate sector must be successful, and generate capital, if environmental problems are to be solved.

STRATEGIES FOR SUSTAINABLE URBAN UTILITIES

SESSION 1

TOWARDS A WASTE-FREE CITY

Session Chair: Richard Gilbert
Metropolitan Councillor, The Municipality of Metropolitan Toronto
Chairman, Standing Committee on Environmental Issues, Federation of Canadian Municipalities

These sessions examined the implications of a waste-free city, specifically the opportunities presented by urban waste management systems. The speakers in the first subsession outlined the steps individual countries have taken to achieve waste-free cities. The second subsession addressed technologies, services and programs available to aid municipalities reduce solid waste.

SUBSESSION 1

Is It Really Possible to Reduce Municipal Solid Waste?

Speaker: Howard Levenson
Senior Analyst, Office of Technology Assessment,
Washington D.C., U.S.A.

The generation and disposal of municipal solid waste is a very serious issue among developed nations such as the United States. The U.S. alone, on a per capita basis, produces one tonne of municipal solid waste annually. Although there are no easy answers to this problem, solutions must involve a coordinated effort towards better materials management, use and conservation. Two popular activities which incorporate these elements are recycling and reduction programs. A general trend towards recycling has begun in many communities, businesses and factories. For example, the American Paper Institute is investing several billion dollars in recycling mills to increase paper recycling by 40 percent.

Both recycling and reduction measures seek to reduce the total amount of municipal solid waste destined for landfills. Recycling addresses the end product of solid waste production. Reduction, on the other hand, examines the whole system that produces waste. This includes: extracting the material; feeding material into the manufacturing process; designing the

process; distribution; and the purchase, use and eventual discard of the product. Therefore, reduction measures are much broader in scope and may involve modifying the product so that it contains fewer toxic substances or generates less waste when discarded. Reduction programs may also aim to modify consumer purchasing decisions to favour products which are less toxic, more durable or repairable.

Recycling and reduction programs have had limited success due to lack of economic incentives. In either kind of program, producers of waste do not bear the true environmental or direct economic cost of waste management. Furthermore, our modern society reinforces consumer preference for convenience and disposability in products or commodities.

Consumers need adequate, credible information on the environmental impacts of products before they can make good buying decisions. Local and state governments can participate in the education process. However, this will yield only limited success given that many products are marketed across state boundaries. National governments must share the responsibility of reducing waste by: (1) regulating the contents of products; (2) encouraging government departments to purchase items less toxic and more durable; and (3) rewarding industries for environmentally sound practices. Dealing with municipal solid waste is not just a local issue. All levels of government must work together to educate the consumer and industry on solutions to the problem.

The Japanese Approach Towards Waste Minimization and its Future Perspective

Speaker: Hidenbou Ogasawara

Officer, Foreign Affairs, Clean Japan Centre, Tokyo, Japan

The Japanese approach to waste management involves both comprehensive legislation and community group commitment and cooperation. Waste management laws in Japan distinguish between industrial and household waste and determine who is responsible for their disposal. Household-generated waste is a municipal responsibility, while industrial waste is a corporate one. This distinction provides the framework for waste management activities in Japanese society.

Government and community groups undertake two kinds of initiatives to promote the reduction and recycling of solid municipal waste: source separation and group collection. Guided by local government policy, source separation undertakes to separate different kinds of municipal waste to the greatest extent possible, while recovering resources at the collection/separation stage. Solid waste is classified as mixed waste, combustible and incombustible waste, and special waste, and separated accordingly.

Group collection activities, although similar to the source separation program, differ in they are not part of municipal

government efforts. Their objective is to ensure broad community participation in resource recovery. Widespread support for local actions are reflected in a survey which showed:

- 78 percent of local governments responded favourably to group collection;
- 60 percent felt it was necessary to rebuild waste management facilities to reduce the volume of waste for final disposal;
- 66 percent would like to promote source separation programs.

The Japanese experience shows that effective waste reduction requires cooperative efforts and a balance between comprehensive legislation and community group activities. In Japan, source separation and group collection work together to curb the amount of solid waste. Government regulation alone is not sufficient to reduce municipal solid waste. Policies that educate and encourage community participation are also needed.

Modernization and Waste Absorbing Cities in Asia

Speaker: Christine Furedy

Associate Professor, Faculty of Environmental Studies, York University, North York, Canada

Modernization has generally been thought of as the key to waste minimization. This has not been the case in Asian cities.

Although modernization provides some benefits to the inhabitants, it has widely threatened the waste absorption capacity of these cities. Most solid waste generated in Asian cities and remaining in landfill sites is organic. Therefore solid waste can be safely used for agricultural purposes, or disposed in landfills within the city limits, or in close proximity. Calcutta, for example, re-uses more waste for food production than any other city in the world. City authorities parcel up old garbage lands into vegetable farms, while farmers collect the compost produced within the city limits. Such practices have made traditional Asian cities waste absorbing.

Modernization has not been sensitive to the existing waste management practices within Asian cities, one of which is resource recycling. Foraging through garbage dumps and cans has become a means for subsistence for the majority of the urban poor. The activity not only benefits them but produces a higher quality compost. The waste which remains in the dump sites after recycling is organic, resulting in a compost with higher nutrient value. Granted, this kind of resource recycling requires the presence of a low status group, but it does have advantages. Modernization discourages this practice, to the detriment of the poor. For example, local governments view the tools for recycling used by the poor as old fashioned and an obstruction to modernization that must be phased out.

External pressures from industrial countries have also countered traditional waste absorbing practices in Asian

cities. Industrialized societies usually assume that they "know what is best" when they give aid. But, in fact, measures introduced by industrialized societies inhibit traditional waste recovery and recycling practices in Asian cities. Industrialized societies should be more sensitive to traditional waste management practices employed by the inhabitants of third world countries. Modern waste treatment methods must build upon rather than eliminate traditional waste recovery and recycling methods. Otherwise, modernization, will destroy this sustainable attribute of Asian cities.

SUBSESSION 2

The Blue Box System

Speaker: Derek Stephenson
President, Resource Integration Systems Ltd., Toronto, Canada

The Blue Box system, or curbside collection, enables citizens to actively participate in the reduction of municipal solid waste. This is the start of a reorientation of the entire solid waste management system. At the end of 1989, approximately 11 million households received regular curbside services. Participation is projected to increase to 20 million households by 1991.

Curbside collection is only the first step towards a solution to the municipal solid waste issue. Other progressive options include: restructuring the system to give people more waste management choices; introducing user-pay systems to impose the true cost of owner-generated waste; using product price modification to alter behaviour; and influencing product package and design through regulation. These measures will reduce the amount of municipal solid waste that society generates as a whole.

The success of curbside recycling in one region does not mean that the identical system will work well in all communities. Many factors play a role in effective recycling -- for example, the size of the containers, the frequency of collection and the type of collection vehicles. These factors must be considered together, and in the context of the local conditions. While the same system may induce identical participation rates in different regions, recovery rates may differ, due to local variables. In-depth planning prior to implementation will produce an effective curbside collection program that will reduce waste while creating a more responsible community.

Operating a Pilot Project for High Rate In-Vessel Composting Of Municipal Solid Waste

Speaker: Paul Manley

Vice-President, Airrite Environmental Industries Incorporated

Glenda Gies

Director, Waste Management, Airrite Environmental Industries Inc. Richmond Hill, Canada

Composting as a waste-reducing activity is gaining support as an environmentally friendly alternative to landfill sites for many reasons. First, it is more cost effective, especially with many landfill sites reaching capacity. Second, modern advances in composting has opened the way to the production of quality compost, high in nutrient value and free of heavy metal contamination.

Airrite Environmental Industries (AEI) has played an important role in the promotion of composting through research in new methodologies. A major focus is to perfect composting methods of organic materials. For example, a pilot project in the Regional District of Powell River, British Columbia, produced a five step composting process. This process consisted of: recovery, pre-digestion processing, aerobic fermentation, post digestion processing, and marketing. The recovery process, in turn, was divided into four phases to test different kinds of

material and to verify their contaminant levels. Waste was separated into residential kitchen waste (including paper waste), kitchen waste from commercial and industrial outlets, yard waste from residential houses, and low grade unmarketable paper. The result was a higher quality compost.

Furthermore, AEI investigated the types of barriers which inhibited the widespread adoption of composting. One such barrier was the odour associated with composting. AEI eliminated this obstacle by providing households with recyclable plastic bags for dry collection. The project also concluded that source-separated food waste has few contaminants, low levels of heavy metals and is acceptable to industries. These findings show that source separation of organic material for composting can provide a sustainable method for waste management in urban environments and contribute to sustainable agriculture in the future.

Packaging Options

Speaker: Shelagh D. Kerr
Vice-President, Technical, Grocery Products
Manufacturers of Canada, Don Mills, Canada

Thirty percent of the total waste our society produces is municipal solid waste. Of this amount, 40 percent is packaging material, and 50 percent of this is due to grocery packaging.

Hence, reducing the amount of packaging in products will help minimize municipal solid waste.

One way to achieve this end is to evaluate current packaging options available to industry. Companies have shown some movement towards environmental awareness by recycling corrugated packaging, purchasing corrugated cardboard made from recycled fibres, reducing excess packaging, and favouring thin-wall containers. Furthermore, technology is helping to design better packaging. Machine-readable codes have been included on labels, changing the way packaging is used to measure direct product cost.

Reducing packaging material makes good economic and environmental sense at both the consumer and operational levels. However, fundamental change may not be possible because of the way packaging is used to protect products during transportation and against tampering, and to maintain product quality and safety. Packaging is also used to convey consumer information and to help stock control and storage. These factors too may discourage companies from reducing the packaging.

New packaging options are also constrained by contradictory consumer behaviour. Consumers demand more packaging, convenience and disposability, thereby encouraging the production of packages which are difficult to reuse or recycle. At the same time, they demand products that are not harmful to

the environment. There is no middle ground between these two extremes.

There are ways to minimize environmental impacts while still maintaining packages that deliver safe, fresh and high-quality products. But to capitalize on packaging options requires a fundamental change in consumer attitudes. One problem is the NIMBY (Not in My Backyard) syndrome, which results in community opposition to facilities that recycle and reuse packaging. Both industry and consumers must understand environmental issues before effective changes can occur.

SESSION 3

PROVISION OF CLEAN WATER

Session Chair: Ken Mcleod

Deputy Minister, Municipal Affairs Recreation and Culture, British Columbia

This session addressed the challenges associated with the supply and demand of potable water. It was divided into two sections: the first focused on the Great Lakes to underline the problems in an area of large population, extensive industry, agriculture and multiple jurisdiction. Speakers from government, industry and non-governmental interest groups offered their perspectives of how this issue should be approached. The second section featured innovative approaches, both high- and low-technology, to handling potable water supply and demand in developed and developing countries.

SUBSESSION 1

Provision of Clean Water - A Non-Government Interest Group Perspective

Speaker: Phillip E. Wellar

Executive Director, Great Lakes United, Buffalo, U.S.A.

The presence of over 1,000 man-made chemicals in the Great Lakes has undermined the ecology of the Great Lakes system. Chemical pollution from direct discharge, atmospheric fallout, and non-point sources of pollution (ie. runoff) have resulted in the extinction of species (ie. Atlantic Salmon), the damage of natural features and a widespread concern for public safety.

People want clean, safe water, and a healthy environment. The Great Lakes United organization is a bi-national coalition of groups dedicated to the conservation of the Great Lakes Ecosystem. The multi-boundary, multi-jurisdictional responsibilities of this organization makes it unique. Solutions advocated by the group must be applied in two countries and in numerous municipalities that straddle the Great Lakes system. This is difficult, though not impossible. For example, the Great Lakes Water Quality Agreement between the United States and Canada called for a strong effort to restore significant areas of damage. Furthermore, it advocated zero discharge of persistent toxic chemicals into the Great

Lakes. However, there has been no solid political commitment towards zero discharge. Until this is achieved, the water quality of the Great Lakes water will not improve.

Zero discharge is possible. We must evaluate the production process to identify chemicals at source, and we must eliminate these through stronger enforcement laws and regulations. The failure of government, on both sides of the border, to develop enforcement actions has hindered zero discharge.

Businesses can contribute by designing new products and promoting new ideas to control chemicals. Co-operation from businesses and commitment from government towards zero discharge will not only improve water quality, but the environment as a whole. A healthy ecosystem is not just a dream, but an achievable ideal.

An Intergovernmental Perspective

Speaker: Robert S. Welch
Commissioner, International Joint Commission, Ottawa, Canada

The greatest ongoing challenge to the Great Lakes area is to ensure consistent implementation of policy by all players across jurisdictions and sectors. The 1909 Boundaries Water Treaty was the first significant document recognizing the need

for cooperation between the Canadian and United States governments. In 1972, the Government of Canada, with the Province of Ontario, and the United States signed the Great Lakes Water Quality Agreement, which was renewed and extended in 1978 and in 1987. The agreement sought to restore and maintain water quality in the Great Lakes Basin. Its provisions included:

1) assisting implementation by offering advice to governments and assessing the progress;
2) adopting an ecosystem approach to Great Lakes Water quality;
3) eliminating persistent toxic chemicals, under the philosophy of zero discharge.

These provisions had a number of implications. Municipalities would have to increase their support for clean water policies. The private sector, with its problem-solving capabilities, would also have to become more involved. And there would have to be an ongoing emphasis on the ecosystem approach.

Effective control of toxic effluent in the region requires a coordinated and comprehensive management strategy on the part of governments and the private sector. Remedial Action Plans (RAPs) represent such a strategy. Enacted in 1985, the RAP mechanism brought together all jurisdictions to implement action leading towards a comprehensive ecosystem approach. RAPs provide the institutional framework and planning vehicle for a better future. Education and research will help us adopt

a new ethic that merges economic, environmental and social priorities. Economic prosperity and a quality environment must become parallel objectives.

A Business Perspective

Speaker: George Werezak

Manufacturing Manager, DOW Chemical, Sarnia, Canada

Increasingly, we need to assess the impact of activities on the environment and to mitigate adverse effects. Action plans fulfil these two needs, but are useless if they are not part of a well-defined framework.

A good framework will balance environmental and business interests. This requires communication among all parties involved as achieved through round table discussions on the economy and the environment at the federal and provincial levels. These forums are successful because they educate participants about the conflicting points of view. Only when all parties understand each other can competing interests be balanced and joint action be possible. Only then can we work together towards sustainable development and integrating economic and environmental goals.

Sustainable development requires commitment, change and communication. Commitment involves abiding by sustainable

development principles while taking initiatives. For example, DOW chemical's corporate environment policy promises to minimize adverse impacts on land, air and water and to continuously improve and build upon this principle. However, commitment must be more than rhetoric. It must be paired with appropriate action, for example, altering the way individuals and decision-makers operate. Such behaviour change may be difficult, but important, to maintain. The process can be helped by public education on the common goals of industry and community. Discussing common and differing points of view will develop a greater understanding of what the true issues are. This can lead to effective solutions to problems.

SUBSESSION 2

Emerging Trends in Water Quality Standards and Impact on Water Treatment Processes

Speaker: Allen P. Livingston

Vice-President, Engineering Services, Etobicoke, Canada

Higher water quality standards have precipitated the need for new treatment processes. Source water comes under two influences: nature and human intervention. Improvements to the analytical equipment for the monitoring of water quality has increased detection of micropollutants in water supply. As a result new water quality standards are developed which, in

turn, require new water treatment processes. In addition, progress in epidemiology, toxicology and risk assessment have resulted in more stringent water quality standards. The net result is an overall increase on the part of provincial authorities in establishing more stringent water quality standards. Thus, provincial involvement has grown in such areas as adopting mandatory guidelines and strict standards in response to pressure groups. The most pressing water quality issues that may affect the design and operation of water treatment facilities in the near future include:

1) Pressure from the community to decrease the lead levels in the drinking water at the point of consumption. For example, the Environment Protection Agency (EPA) established the maximum lead level in the drinking water in the United States. If these are exceeded, a public education program is to be initiated to reduce them.
2) Regulations controlling the PH and alkalinity levels of water leaving the treatment plant will reduce the copper and lead found in the drinking water.
3) The United States Environmental Protection Agency proposal to categorize lead with a B2 classification as a probable human carcinogen. This will result in the maximum contaminant level goal for lead in water as zero.
4) The identification of corrosion to home plumbing systems as a major source of cadmium in the drinking water will require upgrading of many of these systems.
5) Public awareness of elevated levels of aluminum in the

drinking water, and the correlation of aluminum to Alzheimer's disease, will promote a reduction of the amount of aluminum in the drinking water.

The 1990s will be unparalleled in the study, design and construction activities related to the quest for safe drinking water. One of the driving forces behind this increased activity will be the Canadian federal government's Drinking Water Safety Act. This will effectively translate Canadian drinking water guidelines into objectives and be a mandatory requirement in those areas under federal jurisdiction.

Wastewater Treatment By Constructed Wetland

Speaker: Kim Choate

Environment Engineer, Chattanooga, U.S.A.

Clean, safe water is essential to the health of a community. However, the available wastewater treatment options for small communities are very limited. Small wastewater generators in the Tennessee Valley Watershed often do not meet the regulatory limits set by higher governments. The problem is compounded because small communities find that conventional high technology methods are too complex, difficult to operate and unaffordable. Effective low-cost technology processes are needed.

The Tennessee Valley Authority (TVA) is a federal resources development agency whose mission is to serve the Valley and improve the quality of life for its people. The TVA has been instrumental in developing innovative low-technology wastewater techniques within the Valley to prevent further degradation of the water supply.

A review of the demonstration projects in Benton, Hardon and Pembroke, Kentucky, illustrates the success of constructed wetland in water treatment for these communities. Ordered to upgrade the water treatment processes under the Environmental Protection Agency, these small communities found that conventional high-technology methods were complex and costly. Instead they used constructed wetland, which were generally successful. The quality of construction of the wetland was critical to this success. It was concluded that current information is adequate to design contaminant-reducing systems. But there is not enough information to ensure consistent compliance.

Constructed wetland are designed to optimize the natural wetland's chemical, physical and biological processes which also occur in treatment plants. There are two types: surface flow wetland containing plants, and sub-surface wetland containing plants and a substrate of gravel or sand. In both cases, plants are vital to the removal of pollutants, especially in the sub-surface flow system where it is important that the root and stem fill the entire depth of the bed to provide more

aerobic surface area. The advantages of wetland are lower capital and maintenance costs, reliable treatment, more wildlife and simplicity of operation. The disadvantages include the large amount of land required, lack of operating procedures, lack of optimum design criteria and unfamiliarity about the process among consultants and operators.

The Urban Water Supply: The Developing Country Challenge

Speaker: Michael McGarry

Principal, Cowater International, Ottawa, Canada

The main environmental questions for the 1990s will come from the lowest income groups living in the urban areas of developing countries. Residents of these squatter settlements have needs, such as a clean urban water supply, which are not being addressed adequately. Garbage and refuse are also serious problems for these communities and contribute to the low quality of the water supply. It is common to associate squatter settlements as a breeding ground for disease.

A number of low-technology solutions, such as latrines, have been used to improve the conditions of the poor. The most basic latrine is the pit latrine. However, this type of latrine has become a breeding ground for malaria, smells and insects, consequently, residents do not like to use them. Vented pit latrines successfully remove the smells associated

with latrines, but are still not widely used by the local residents. The double-pit poor-flush toilet has been greeted more favourably. This is essentially a hand-flush toilet which requires that a bucket of water be thrown in after use to remove the waste to pits. It is relatively inexpensive and can be made by the local mason.

Creative and innovative low-technology solutions are needed for squatter settlements but local politicians give these areas low funding priority. Instead, they channel money towards the productive sectors (ie. energy, industrial) rather than towards the water supply and sanitation of slums. The lack of influence of the urban poor, and their inability to attract investment, perpetuates the problem.

Improving the living conditions of squatter communities is not solely an external issue since the communities themselves resist change. Local governments have tended to view slums as undesirable elements that should be eradicated. As a result, communities have become suspicious of all government initiatives. How can a sustainable water system be maintained if there is no coordination or cooperation between the government and the community? Government attitudes and institutional weaknesses are the main problems. For example, water authority personnel are not familiar with low-income communities and are not knowledgeable in the appropriate technology for these areas.

These imbalances, or inequities, can be rectified through training and community participation in improvement projects. Municipal representatives must treat the community with empathy, sympathy and as an equal partner in municipal projects. Action must be community-based in order to generate effective solutions. The community has great resources and will respond if organized and given financial and technical assistance.

SESSION 4

ENERGY COSTS OF URBAN LIVING

Session Chair: James Knight
Executive Director, Federation of Canadian Municipalities

This session discussed how to reduce urban energy consumption, while promoting conversion to renewable and more environmentally benign energy sources. The presentations dealt with topics such as building design, energy management systems, domestic energy use, urban transportation and ways to reduce energy consumption.

The Three R's of Energy Management In Buildings

Speaker: Robert Tamblyn
Chairman, Engineering Interface Ltd., North York, Canada

Proper energy management in buildings holds great potential for energy savings. There are three factors involved: (1) review/ redesign; (2) retrofit; and (3) recommission. Redesign is necessary to keep pace with technological change, problems with the building structure, breakdowns in the system or changes in

occupancy and use. Retrofit is similar to a survey or audit that assesses existing buildings to determine how, how much, where and when energy is being used. The answers to these questions determine what energy-saving solutions to apply and what funding options to explore. Recommissioning sets objectives as new systems are installed. One problem with recommissioning involves new owners who frequently occupy a building before its systems are fully operational. This makes it difficult to complete a final balance and results in the incomplete commissioning of the building. Recommissioning requires checking all equipment and properly training the operators while monitoring the feedback from the system.

Residential and commercial buildings present excellent opportunities for energy savings in a number of ways. For private homes, utility companies could provide incentives for the purchase of more energy-efficient appliances. These may cost more in the short term, but more than pay for themselves over time. In commercial buildings, energy consumption has been reduced significantly through moveable lights and switches and through motion switches to shut off power to equipment, such as photocopies, when not in use.

The biggest obstacle to the adoption of energy saving technology is the tendency among builders to favour "old and reliable" technology rather than that which is new or experimental. Many builders want to see new technology in operation for a number of years before they are willing to

integrate it into their construction plans. But if energy use is not scrutinized and new methods for energy savings not applied, our society will never be sustainable.

Energy Efficiencies Of Urban Transportation

Speaker: Tom Parkinson
President, Transport Consulting Ltd., Vancouver, Canada

Urban transportation is a major consumer of non-renewable oil resources and a major contributor to the degradation of the environment. A comparison of consumption rates by mode of transportation shows that the automobile burns three-quarters of the oil used in urban transportation. As well, the car consumes four times more energy per passenger-kilometre than the diesel bus, and eight times more than an electric transit vehicle. Despite the energy inefficiency of the automobile, it remains the most popular mode of travel.

Some of the factors which may influence the transportation choices of individuals include congestion, costs to the user and pollution produced. When travel becomes too congested or tedious, those with the ability to do so will change their residence, their employment or their mode of transportation. Congestion consumes time, a valued commodity among individuals. This factor alone should encourage the use of more efficient transportation modes. The second element, the real costs of

urban trips, are rarely paid for by the automobile owner or transit passenger. Rather, municipal taxes pay for building, maintaining, cleaning, lighting and policing roads. Urban trips also produce some indirect environmental, social and health costs. These include air and noise pollution, time lost through traffic congestion and associated damage to health. Urban transportation is the single largest polluter in cities, especially during the rush hours when pollution is concentrated and aggravated by the higher level of emissions at lower speeds.

The review of transportation systems must include models that are efficient, low energy, and highly cost effective when overall expenses are considered. We have five main ways to control or reduce the energy used for urban transportation: substitute communications for commuting, reduce commute distances, produce higher vehicle energy efficiency, promote the use of alternative fuels, and switch to transit systems. Successful solutions, however, will reflect a combination of all five factors. The move to transit, if combined with support from all levels of government, will have a greater impact on energy conservation in the short and medium term than any of the other measures alone. However, radical changes in land use, combined with a switch to alternative fuels, offers the greatest potential for long-term reduction of both energy use and pollution.

We must deter private automobile use by, for example, discouraging free and subsidized parking. We must encourage environmentally friendly modes of transportation such as walking or cycling. The ultimate goal should be to reduce fuel consumption in each transportation mode, thereby minimizing their adverse impacts.

The Urban Cooking Fuel Situation in a Third World Country

Speaker: Davindar Lamba

Executive Director, Mazingira Institute, Nairobi, Kenya

The energy costs of urban living in Kenya is associated with the cooking fuel crisis. A case study of high-, medium-, low- and very-low-income households showed that those with the lowest income paid the highest portion of monthly income for fuel. Very-low-income households spent 20 percent of their incomes on cooking fuel, while low-income families spent 10 percent, middle income families 6 percent, and high-income families only 4 percent. The study also found that 30 percent of the household income of the very poor is spent obtaining food. Thus, the poorest families spend, on average, 50 percent of their earnings on obtaining and cooking food.

Although cooking fuel alternatives exist, those available to the poor, wood and charcoal, prove to be limited in supply. With an urban population of four million (70 percent of which

is poor), the demand for fuel wood outstrips supply. Urban consumption of affordable fuel creates an unsustainable reliance on already strained forest resources. The only feasible option for these low-income groups is to search for food which requires no cooking fuel. When scarcity pushes fuel prices upwards, the poor are forced to spend even more on fuel or to eat meals which require no cooking, but are less nutritious.

National policy as well as local authorities should address the issue of wood-fuel resources. The government of Kenya must shift its focus from rural targets to urban areas. Solutions to the cooking fuel crisis must incorporate subsistence products which the poor can produce cheaply and cleanly and from which they can generate income.

Planning for a Sustainable Energy Future

Speaker: Linda Krugel
Acting Director, Portland Energy Office, Portland, U.S.A.

Through its energy office, Portland, along with San Francisco and San Jose, is participating in a project called Urban Sustainable Cities. The aim is to reduce the energy consumption of these cities through local government action. One way is to promote energy saving technology. Although, the

technology for improved energy efficiency exists, new policy initiatives are required to implement it.

The three cities work closely together while coordinating the development of their individual plans. San Jose is in the process of identifying a variety of policy options and calculating the energy savings of each. With this information the city can tie public policy options to specific numeric targets. In contrast, San Francisco takes a code enforcement approach.

In Portland, after reviewing the ordinances of the city's energy policy, it was concluded that a new policy was needed to address the issue of sustainable growth. Five task forces were formed to review data on energy supplies, building technology, industry and transportation, and telecommunications. The five reports concluded that energy-saving technology is available, but problematic to implement. In light of this, the task force made recommendations that were eventually incorporated into a rough draft of a new energy policy, later reviewed by a Technical Review Committee. Major trends reflected in the policy were the need for:

- new sources of energy;
- new building codes to increase energy efficiency in new residential and commercial structures;
- use of alternative fuels;
- major new household appliances to meet new energy-efficiency

standards;

- carbon emission taxes to be adopted by the federal government;
- stricter federal regulations for coal burning;
- federal fuel standards for energy efficient cars;
- use of communications to reduce transportation energy use;
- more information on energy issues;
- energy efficiency to become an important component to the local economy.

The primary goal of the Portland Energy Policy is to promote a sustainable future by increasing efficiency in all sectors by 10% by the year 2000. The current action plan reflects a stronger city role, a transportation element and a new section addressing telecommunications.

SESSION 5

ENVIRONMENTALLY FRIENDLY TRANSPORTATION

Session Chair: Wilfred Owen

Guest Scholar, Brookings Institute, Washington

Speakers in this session presented ideas for making urban transportation systems consistent with sustainable development policies. Topics included coordinating activities in urban transportation planning and development, and the inputs needed for an environmentally friendly transportation system.

Environmentally Friendly Transportation - An Overview

Speaker: Richard Soberman

Chairman, Department of Civil Engineering, University of Toronto

As automobile use increases, so too does the accumulation of carbon dioxide, one of the most damaging and noxious gases in the environment. The greater the quantity of gasoline used to move people about, the greater the degree of air pollution. Automotive travel must be reduced with the help of technology, better land use and transportation policy.

Technology in this context refers to fuel consumption and pollution standards developed and/or imposed by governments at the national level. These national standards attempt to establish average targets for fleet fuel consumption rates as well as the type of fuel permitted. The second element, land use planning, can influence fuel consumption positively or negatively. To decrease fuel consumption, planning should focus on the spatial distribution of growth, the density of development, and the mix of different activities. These factors can dictate where and how far people travel in their day-to-day activities. Finally, transportation policy aims to make travelling more efficient through increased transit use, reduced total kilometres travelled, and improved traffic flow. These elements, if incorporated properly into a comprehensive transportation plan, will reduce automobile travel.

Land use intensification, appropriate technology, equitable pricing, traffic management, open planning, and a return to professionalism are other ways to reduce automobile use and hence carbon dioxide pollution. The first four elements encourage more energy-efficient modes of travel. These methods include: concentrating high-density development around transit nodes, choosing the appropriate transportation technology according to cost effectiveness related to need, and eliminating all automobile-related tax deductions (e.g., those for ownership and for operating and parking expenses). The final two elements emphasize public participation and the need

for educated decision making to encourage better transportation systems.

Transportation Planning in a Megalopolis

Speaker: Sonia Litz
Architect, Secretariat General de Obras, Mexico City, Mexico

Despite the size of Mexico's transit system, the country still has a big transportation problem. Approximately 29.4 million person-journeys per day occur within the boundaries of Mexico City. During rush hours, most of these journeys are to school, work and home. Transportation systems during the peak hours are overcrowded and congested.

Attempting to curb congestion, Mexico has developed a fairly sophisticated and much-used subway system for its urban population. The system operates at 4.8 million passengers per day, or 16.3% of the total journeys which occur daily. It has 141 kilometres of track, 125 stations, 8 lines, and 2,000 metro cars running each day and is the backbone of all other collective means of transportation. Despite the heavy investment in mass transportation, Mexico City is still very congested. Its high altitude and the rush-hour demand have made air pollution all the more acute. In response, the city

has adopted a program restricting the use of private vehicle for urban transportation.

Mexico City's huge transportation problem is rooted in its population growth and concentration. Non-polluting urban transportation is crucial for medium-sized cities and megalopolises. There is an imperative to explore transportation alternatives which have medium and high capacities in order to rationalize the energy consumption, avoid pollution and discourage private automobiles. The government must find ways to use resources in a creative way to improve the quality of life for millions.

Recent Trends In Urban Transportation Demand and Their Potential Impacts

Speaker: Robert Chapleau

Professor, Transportation Department/Department of Civil Engineering, Ecole Polytéchnique de Montéal, Canada

The problem of transit usage and financing is related to demographic trends and suburban development. Origin destination surveys of travel demand confirm this suspicion. One of the most widely used origin destination surveys is the MADITUC survey, which collects a variety of demographic and travel information. This approach is based on three factors:

1) the territory where spatially referenced data are essential for consideration of geo-political issues that identify the beneficiaries and the financially redistributive effects;
2) the network defined with nodes, links and routes;
3) the demand, which encompasses travel purpose, socio-economic and age-sex factors, and the time of travel.

MADITUC helps identify major demographic trends which affect travel, such as population aging and urban sprawl, and allows the monitoring of transit decline and traffic congestion. Data from MADITUC have been used to analyze the medium- and long-term effects of population aging and continuous urban sprawl on transportation systems. Other factors influencing transportation systems and monitored by MADITUC include: the baby boom generation, increased participation of women in the work force, greater individual mobility, a trend towards younger families in the suburbs, and household size increase in the central business district.

Origin destination surveys can also assist in transit financing by clarifying underlying issues. For example, transit financing is heavily subsidized. Financing problems arise when the majority of the riders live in the outer suburbs and hence beyond the taxing scope of the transit authority. In this situation, the riders from the outer suburbs benefit from the urban transportation network without compensating the system.

The urban transportation problem is linked to the lack of adequate land pricing and road pricing. An environmentally friendly urban transportation system requires a self-regulating mechanism of land use and of travel demand. Road pricing could be such a selective, self-regulating process.

Southern California's Regional Mobility Plan

Speaker: Pat Russell
Chief Executive Officer, Regional Institute of Southern California

The primary challenge facing Southern California is to maintain its economic vitality while protecting the environment. Transportation is key to both these ends since the movement of people and goods is essential for a dynamic economy, and the transportation method has a direct impact on air quality.

In 1989, the Metropolitan Planning Organization for the Southern California Region adopted a Regional Mobility Plan. It aims for an efficient balance among all transportation modes, a process which includes utilizing new technologies for a more environmentally friendly transportation network. The Southern California Association of Governments incorporated the Plan into an overall strategy to address growth management, air quality and mobility. However, funding must still be secured before the Plan can be implemented.

The Plan relies on four elements: growth management, transportation demand management, transportation systems management and facilities development. Growth management refers to the patterns of housing development and employment growth which achieves a balance between jobs and housing. Transportation demand management focuses on reducing commuter demand on the region's transportation network. Some methods promoted include: ridesharing, increased use of public transit, telecommunications, flexible working hours, and the increased use of non-motorized modes such as walking and cycling. The third element of the strategy, systems management, aims to maximize the efficiency of the existing transportation network. Programs to this end include: restricting the use of freeway lanes to ridesharing vehicles during peak periods of travel, and restricting the delivery of goods during peak travel time in urban areas. The final element, facilities development, introduces new facilities to the existing system. Of particular interest are facilities with the capacity to carry more than one person per vehicle. These four elements are interdependent and mutually supportive.

The world looks to Southern California for leadership in solving congestion and numerous environmental and economic challenges. Prudent research, analysis, implementation and cooperation between various entities are key to achieving the goals of an environmentally sound and economically healthy global community.

SESSION 2

PLANNING BETTER URBAN SPACE

Session Chair: Kevin J. Garland
Vice-President, Planning and Design, CIBC
Development Corporation, Toronto, Canada

Session speakers examined methods for planning the best possible urban space from environmental, economic and social perspectives in developed and developing countries. The speakers from the first subsession pondered the question, "What is better urban space?" followed by case studies of practical strategies.

SUBSESSION 1

Sustainable Urban Areas: What is Better Urban Space?

Speaker: Peter Hall

Professor and Director, Institute of Urban and Regional Development, University of California, Berkeley

Good urban space must look good, feel good and work well. Thus, good urban design requires a delicate balance between these objectives, which are frequently in conflict with one another. The North America creation of new commercial space in the form of office complexes or shopping malls on greenfield sites is an example of failure to achieve a balance. Although, new urban spaces may be a model of functional efficiency, they can be sterile, alien and hostile places in which to live.

Planning urban space also requires that we take modern-day crime into account. As designers plan urban space they must do so in an increasingly hostile world. No urban designer could have anticipated how much society would deteriorate. The worldwide reaction against the Corbusian multi-story mega-structures of the early 1970s is an example of a concept that no long works. Corbusian development involved high density, low-rise housing schemes which soon became a "muggers paradise" as footpaths became a haven for crime. Another example is a neighbourhood in front of London's British museum which

planners designated for pedestrian use only after it became prone to heavy flows of tourists and automobile traffic. Residents protested when they found that at night, with the tourists gone and no cars passing by, the streets were isolated and dangerous. Crime, in both examples, was the major obstacle to the development of good urban space. It may be easy to state what good urban space should do; it is not so easy to achieve this end.

Nowadays it is harder to develop a urban space on a human scale. As a result, in the quest for a secure environment and society, the human element is often left out. In the preceding examples, it might have been better to achieve security by finding ways to keep the streets full of people at night or by discouraging crime through the intensive use of street lighting and street furniture.

Designers are achieving some success with new urban environments, which is encouraging. We need to carefully analyze such success stories and determine which elements can be applied to other communities. One thing is clear -- the measure of good urban space is its ability to attract people.

Planning Better Urban Space

Speaker: William Teron

President, Teron International, Toronto, Canada

Good urban space or planned development that is based on environmental factors enhances human potential and the human spirit. The speculative process does not promote this kind of development and is responsible for many modern-day problems. Instead, the speculative process encourages the purchase of thousands of acres of suburban land before it is needed, leaving the land unproductive for decades while developers wait for zoning approval. This leads to unstructured urban growth with densities too low to support services or public transportation. The results include environmental, social and economic problems associated with affordability, as well as less access for many disadvantaged groups to resources and opportunities. Thus, speculation promotes inequality.

Speculators who receive windfall profits as a result of rezoning of land do not share the cost of servicing the growth. Rezoning should not be free. Developers who do benefit financially from the rezoning should also share the cost of servicing the new growth. A significant portion of windfall profits should be re-directed to servicing. We need a planning process that implements cost-sharing mechanisms prior to development to attain sustainable growth. Additionally, we

need to designate growth densities for the macro urban environment based on the ability to build and support the services required. This can only happen if there is a political commitment to a non-speculative planning framework.

Better urban space requires more harmony between the natural and built environments and more attention to human needs. We can help people and the environment with a structured planning process, especially if it does not focus too much on the automobile. A planned process will also address important socio-economic issues such as access to resources and economic and social opportunities.

Economic Perspective on Better Urban Space

Speaker: Lyndsay Neilson
Chief Executive, National Capital Planning Authority,
Barton, Australia

Urban growth in the City of Melbourne during the post World War II period occurred mainly at the outer urban fringe, while the inner metropolitan areas experienced a decrease in population. This posed several problems. First, fringe area growth was largely characterized by low density development. This type of development increased the cost to both the private and public sector for the provision of physical and social infrastructure. Second, the decrease in population in the inner city

metropolitan area made it difficult to sustain the existing level of services.

This type of urban sprawl was the result of improper planning. Proper planning can result in substantial cost savings to urban residents as well as greatly improve the quality of life.

A cost-benefit analysis comparing fringe versus inner city growth substantiates this claim. The analysis, in both cases, involved situating 8,000 residential units. It was found that increasing residential opportunities of established urban areas with the infrastructure capacity as opposed to fringe development had substantial gains both socially and financially.

This conclusion has prompted the city government to promote growth alternatives to the urban fringe. A guide to the future growth of Melbourne, published by the Government of the State of Victoria, promotes urban consolidation as one of its key themes. Other policies oriented towards urban consolidation include: policies to reduce the decline of inner city areas, stabilizing the population in the middle suburbs and stemming the flow to fringe areas.

SUBSESSION 2

Planning Better Urban Space: Lessons From Villa El Salvador

Speaker: Andrew Maskrey

Representative, Intermediate Technical Development Group, Lima, Peru

Urban growth in Lima has followed two patterns: first came the urbanization of well-located, easily serviceable, good quality agricultural land on a commercial and speculative basis; second came the urbanization of vacant land by very-low-income groups, forming squatter settlements on inadequate sites.

The cost of infrastructure for squatter settlements is usually three to four times higher than for similar installations on flat, well-located land used by commercial developers. Residents of squatter settlements are at a further disadvantage since their dwellings are located 30 to 40 kilometres from the city centre. As a result, the people who can least afford it must pay a high price to travel to and from major areas of employment.

The poor living conditions of many of Lima's squatter communities are not so prevalent in the community of Villa El Salvador. This is because of self-management by a community organization, which has achieved remarkable results despite a

lack of resources. The organization, the Self-Managed Urban Community of Villa El Salvador, has participated with government, non-government, international, and private sector organizations to acquire the needed resources. A number of developments have set this squatter settlement apart:

1) The relocation of squatters in a planned layout meant that areas were reserved for future settlement expansion, community facilities, and infrastructure installation and transport. This allowed for control over urban growth. As settlements grew, so did the pressure to invade the land set aside for community facilities. The community organization prevented this by enacting effective land-use measures.

2) Under the guidance of the Self-Managed Urban Community of Villa El Salvador, community censuses were conducted in 1973 and 1984 to ascertain housing, employment, transportation, health and education needs. The results were used to develop a health plan and in other planning.

3) The local government passed a decree explicitly recognizing the decisions of the community organization, thereby legalizing or institutionalizing community organizations.

The experience of Villa El Salvador demonstrates that better urban space can be achieved through local management and control.

Environmental Issues in Vancouver Area Development Projects

Speaker: Michael Geller

Principal, The Geller Group, Vancouver, Canada

Environmental concerns must not be used as an excuse to stop all development. A prosperous economy can be achieved in conjunction with a better environment, as demonstrated by the city of Vancouver. Good development in this city has done the following: cleaned contaminated sites on the Vancouver waterfronts, on the south shore of False Creek and on Granville Island; improved the deteriorating infrastructure; relocated noxious industries from prime waterfront sites in the New Westminster region; and reduced automotive traffic through development which integrated residential, commercial and open space.

New development creates a healthy economic climate, which allows all sectors of industry to upgrade the environment. But this is only possible if development and real estate industries address environmental concerns. They must do this by preparing environmental impact studies before a project begins and by working cooperatively with environmental groups.

Governments can also assist through regulation and performance standards which inform the industry of what can and should be done. Frequently, the development industry is confronted with mixed signals from contradictory government regulations. We

need measures to mitigate environmental impacts, but these measures must be realistic, particularly when worthwhile developments are proposed.

Governments must also undertake education programs. At the same time, the media must stop sensationalizing issues and give the public, instead, balanced information and reporting, especially on the impact of development on the environment. Knowledge and understanding should replace extreme emotional reactions. Governments and developers must work together to ensure that new development meets planning and environmental concerns. Development, if done well, can enhance natural features.

Multi-function Polis: An International Joint Venture to Create A City of the Future

Speaker: Paul Greenhalgh

Director, Multi-function Polis Project, Andersen Consulting, Arthur Andersen and Co., North Sydney, Australia

The Multi-function Polis (MFP), an International Test Marketing Project, has proved that investors are eager to support new environmental initiatives. The MFP is a joint effort by the Japanese and Australian governments to build a new city which does the following: promotes internationalization; provides

opportunities to apply new knowledge, technology and economic development schemes; and addresses the global challenge of environmental quality. The idea is to create a sustainable city which incorporates environmental, technological and human concerns. Both cities and corporations of the next century will have to meet this challenge.

The MFP has three characteristics:

1) A commercial framework which creates a testbed for technology, particularly environmental management technology.
2) The integration of spaces in which people live, work, learn and play, to create an environmentally sustainable urban setting.
3) A cosmopolitan city analogous to an Olympic village for international investors. It will provide residential accommodations, training and development and lay the groundwork for specifically targeted growth industries.

Marketing research for the MFP was initiated with a target audience of potential international investors. The aim was to find out which attributes of the proposed city would have to be re-evaluated or dropped for the project to be of commercial interest. The respondents, business decision-makers, were generally enthusiastic about the prospect of investing in a city-of-the-future. They were particularly keen about the international aspects of the MFP, but less so about MFP as an Asian-Pacific springboard and as a testbed new technologies.

Respondents felt that new cities are not needed to test new technology. But the survey did show that investors are willing to support cities which incorporate environmental, technological and human interests. Protecting the environment need not occur at the expense of the economy.

SESSION 3

QUALITY OF URBAN LIFE

Session Chair: Eugene Flichel
Senior Vice-President, Policy, Research and Programs, Canada Mortgage and Housing Corporation, Ottawa, Canada

Presentations in this session focused on the interrelationships between quality-of-life issues and environmental concerns. Case studies from Asia, Europe and Canada illustrated strategies for improving the quality of life in different cultural and economic contexts.

Quality of Life in the Developed World

Speaker: Sigfried Brenke
Director, Urban Affairs, Organization for Economic Cooperation and Development, Paris, France

Traditionally, society's level of well-being was a reflection of its economic health. Prosperity and progress were seen as directly related to economic growth. However, the 1970s were characterized by the emergence of a very different perspective. Prosperity and progress were no longer seen as a function of

economics, but rather a set of quality of life issues. Thus the 1970s were characterized by attempts to develop and measure quality of life indicators. Unfortunately, these efforts were too theoretical, impractical and incomprehensible for decision makers and eventually fell into disfavour.

Presently, there is a resurgence in the interest in quality of life. Also, there is the realization that there are some geographical implications. Quality of life measurements can be achieved at a variety of geographical scales, with the most useful information gathered at the urban level. This is for two reasons: (1) large aggregates (ie. national studies) tend to hide reality more than describing it; and (2) national policies tend to focus on improving individual sectors rather than seeking the interrelationships between sectors and with external factors.

However, urban successes must be linked to global environmental issues. Cities must work together and with regional, national governments and with international organizations such as the Organization for Economic Cooperation and Development to ensure the comparability and compatibility of data. At present, decision makers have large amounts of information which are not compatible with other data sets. This is not only a waste of data gathering efforts, but also makes it difficult to integrate national policy decisions with those made at local and regional levels.

There is a need to better integrate environmental and economic concerns into decision making. By ensuring that measures of quality of life are coordinated at the urban level, we are ensuring that decision makers are knowledgeable of the environmental and economic concerns, and the implications for sustainable development.

Rethinking the Quality of Life in the Cities of the Third World

Speaker: Jorge Hardoy

President, Instituto Internacional de Medio, Ambiente y Desarrollo, Buenos Aires, Argentina

Urban growth in Third World countries has been synonymous with poverty and destitution. The world's greatest challenge is to eliminate poverty and create better living conditions for people in developing countries. However, poverty has not received the national or global attention that environmental issues have attained. Third World urban problems deserve more attention from national governments, multilateral and bilateral agencies and greater research funds because of:

1) the increasing size of the urban populations;
2) the prevalence of poverty in cities;
3) the role of both the formal and informal economy of cities in the gross domestic product;
4) the fact that the political future of many Third World

nations will be decided in the cities;

5) the neglect of basic needs that urban low-income households encounter.

To improve quality of life, Third World nations must develop a more detailed, accurate, and nation-specific understanding of changes in the spatial distribution of their economic activities and populations. This will require more detailed analysis of regional differences within countries and more location-specific remedies. By coordinating their programs and projects, national and local governments can transform housing and living conditions of poorer urban groups.

Achieving these ends requires stronger and more effective local governments in Third World countries. Central governments must curb tendencies to centralize decision making and restrictions on the revenue-gathering powers of local governments. As well, local governments must incorporate new processes of decentralization and democratization. Urban management must take into account the informal economy, which has greatly influenced the distribution of employment as well as traditional relationships between employment and income. Sustainable development is only possible if we address mass poverty through policies promoting social equity. This should be the first goal.

People's Responsible Organization of United Dharavi

Speaker: Julius Miller

Community Organizer, People's Responsible Organization of United Dharavi (PROUD), Bombay, India

The People's Responsible Organization of United Dharavi (PROUD) has brought together the various communities within Dharavi, a slum of Bombay, thereby achieving a new level of community services and infrastructure.

Bombay has a population of 10 million, of which 48%, or approximately five million people, are slum dwellers. Despite these numbers, the state government has done very little to help the slum dwellers or protect the environment. The problems are compounded by large-scale political corruption .

In 1978, people in Dharavi started a training program known as the "on-going issues solving process." Its main objective was to help residents organize effectively to address community issues. The result was PROUD, a community organization which united people across all age, sex, language and caste barriers.

PROUD enables the people of Dharavi to speak with one voice in dealing with various levels of government. For example, PROUD's first encounter with the Bombay Municipal Council (BMC) resulted in swift action on garbage removal and sewer drainage

for the area. This occurred after PROUD's Action Committee organized protests, during which people deposited garbage and packets of flies at the municipal offices. Through such protests and other forms of communication with the various levels of government, PROUD has prompted improvements that would not otherwise have been made.

Toronto's Healthy City Project

Speaker: Art Eggleton
Mayor, City of Toronto, Canada

With the global trend towards urbanization, the fate of our planet depends on how we live in cities and whether we make some much-needed changes. At present the administrative structures of cities rarely reflect the complexity of environmental issues. Actions are piecemeal, made in isolation and do not consider total effects. Municipal departments make decisions without completely understanding the interlocking relationship between the social and physical environments and development.

The Healthy City Project in Toronto brings a more holistic approach to planning. It focuses on the community as a whole and the social, mental, economic and physical well-being of its citizens. The project came about as a result of community workshops organized by the City in the 1980s to discuss ways to

keep Toronto liveable. Four years later, City Council unanimously approved a report called Healthy Toronto 2000 which set forth 89 recommendations. The document defined "healthy" to encompass the broad range of environmental, social and individual factors in people's lives.

One of the more important outcomes of the Toronto Healthy City Project was awareness of a need for a coordinated approach to urban issues. In October 1989, the Healthy City Office was established to ensure cooperation among all city departments and to bring the community and private sector together to achieve common goals. This was realized in the establishment of the Environmental Protection Office. Other initiatives included the Main Streets Project, Street City, the Safe Cities Committee, programs to reduce carbon dioxide emissions, and the reclamation of the Don River.

The Healthy Cities Project in Toronto represents bold steps in addressing problems within local jurisdiction. These steps include legislation and programs which involve citizens and private sector participation. The municipal government is playing an important role in furthering a healthy community and sustainable development.

Urban Revitalization and the Quality of Life

Speaker: A. Len de Klerk

Head of Research Section, Department of Housing and Development, Rotterdam, The Netherlands

Rotterdam's city structure reveals the contrasts between the old city, non-sustainable urban renewal of the 1940s and the improved practices of today.

The post World War II era was characterized by three stages of urban planning:

1945-1970	Rebuilding and Reconstruction
1975-1985	Housing and District Rehabilitation
post 1985	Urban Revitalization and Regeneration

The first post-war stage was influenced by the desire for an economic nucleus in the city centre and for a city structure that reflected the rapid growth of car ownership. By the end of the 1960s, however, it became apparent that these aspirations were grossly inadequate. The creation of office-dominated and car-accessible city centres destroyed the historic city, its small scale, aesthetics and amenable features. The inadequacies of previous urban planning practices gave rise to small-scale renewal with the focus on housing for lower income groups and district rehabilitation.

Urban planning changed from a bureaucratic top-down activity to bottom-up participation planning.

The economic downturn of the early 1980s caused yet another transformation of urban planning. Poor housing conditions were no longer the main problem, but rather, the dysfunction of the city as evidenced by unemployment and the difficulty of attracting new economic activities to Rotterdam.

Within a few years, the urban renewal policy gave way to a broad urban revitalization policy which aimed for an integration of economic, social and urban planning and renewal. In this plan, the city was made more attractive to new types of economic activities and to new types of households in the middle and higher income groups. This was done by the recycling and reconstruction of urban land for economic and residential activities. Thus, the modern approach can be described as building new towns in existing towns, or reusing old buildings for new purposes.

SESSION 4

SHELTER AND THE SUSTAINABLE COMMUNITY

Session Chair: Yvo De Boer

Chief, Information Office for North America and the Caribbean, United Nations Centre for Human Settlements (HABITAT), Ottawa, Canada

Presenters in this session explored the links between shelter and sustainable development, looking particularly at individual housing units and their integration into the larger community. Topics included policies and strategies needed to establish sustainable communities in developed and developing counties. As well, the session presented case studies on the application of sustainable development concepts to individual units and to larger-scale projects.

The House as a System

Speaker: Alan Redway

Minister of State for Housing, Government of Canada, Ottawa, Canada

Today's environmental circumstances require that development decisions incorporate economic, environmental and social

considerations. Housing is essential to sustainable development as it directly impacts on the environment, economy and society. However, achieving a balance between the three spheres is difficult.

Sustainable development in home and city presents two main challenges. The first is addressing social, economic and environmental issues in a unified way. Second, sustainable development strategies must consider implications at every level, from individual dwelling, to neighbourhood, to city and to the system of cities. Some issues to be addressed include:

- the effective use of natural resources;
- the involvement of government at all levels;
- the need for partnerships (public, private, and community groups);
- the role of governments in promoting wide-scale involvement in the solutions to urban problems;
- and the search for innovative financing approaches.

Smaller families, larger houses and problematic zoning by-laws are issues which require immediate attention. Larger houses have a number of environmental implications. These homes demand more natural resources for building materials and heating fuels, more land for lots, and more intricate and extended infrastructure. As a result, houses are less affordable. Part of the problem is the bylaws which control house sizes and lot sizes. The very bylaws set to maintain

housing and community quality often block new ideas to make better use of resources and produce more affordable housing.

Sustainable development will be nothing more than a slogan for academics unless a new consensus is created in society--a consensus that the environment is not a problem but a challenge and an opportunity. The quality of life we enjoy and which our children will experience depends on our success in confronting the issues raised by sustainable development.

SUBSESSION 1

The Advanced House: A Small Step Towards Environmentally-Responsible Housing for Canada

Speaker: Elizabeth White

Project Manager, Advanced Housing, Stirling, Canada

On a per-capita basis, developed countries consume more energy in homes than for any other use. A project to address this issue is the Advanced House, located in Brampton, Ontario. It involves the federal government, the Provincial Ministry of the Environment, Ontario Hydro, the Canadian Home Builders Association, and other trade associations. The Advanced House is a first step towards attitudinal change as it demonstrates, implements and promotes transitional technologies. The technological features of the project include: energy

efficiency, environmentally friendly and renewable construction materials, clean indoor environment, ecological landscaping and use of water saving equipment.

Aside from changing attitudes, the Advanced House identifies some problems associated with new technologies. A big gap exists between technological feasibility and economic feasibility. Many companies with innovative ideas experience financing difficulties for both product development and commercialization. This factor constrains the full maturation of many Canadian technological ideas.

The Advanced House has demonstrated that we need to do more to encourage innovative technology. Ontario Hydro, for example, has introduced incentives for reducing energy consumption during peak load capacity. Such incentives will promote innovative solutions to the way we live and also create a market or demand for new energy saving technology. The Advanced House has succeeded in increasing energy efficiency and advertising new technologies. But we still have far to go to get from the house of today to a sustainable home for the future.

Environment and the Urban Poor: A Necessary but Unholy Alliance

Speaker: Stan Benjamin

Urban Planner and Architect, PLAN:NET - Development Planning and Management Network, Calgary, Canada

The areas available for the urban poor to live in tend to be both undesirable and environmentally sensitive. When choosing a place to live they must weigh three considerations: Is it cheap? Is it close to major sources of work? And, does it have a partial source of raw material for income? The areas that are vacant or available are dangerous, unhealthy, marginal and unmanageable. The fact that the poor live in such areas exacerbates environmental degradation since the poor are the greatest detractors of the environment. The environment that the poor live in, in turn, presents difficult and unsavoury living conditions. Thus, solutions addressing the environment and the urban poor can be considered a two-edged sword in that potential efforts to improve the environment can easily be used against poor people.

In upgrading the environment, we should not destroy poor people's communities, but rather improve their living conditions. Upgrading the air, land and water of cities should be to everyone's benefit. We must strive to create a more habitable environment for all residents and thus a more equitable society. International assistance from the Canadian

government attempted to create a more equitable society. The Canadian International Development Agency's (CIDA) takes a holistic approach to housing in San Salvador, where adequate housing is a scarce commodity. CIDA proposed building 1,000 housing units per year over a five-year period, giving special consideration to land and location, the shelter construction system and urban services, particularly water and solid-waste treatment. The aim was to provide low-income housing that is earthquake resistant and economically viable. As well, CIDA wanted the poor to actively participate in the construction of their shelter and to utilize what they had learned to earn a living. The building systems reviewed were: mud and sticks, block building and lock built. In the process of providing homes, this initiative strove for a more equitable society overall by addressing more than just housing needs.

SUBSESSION 2

Housing as Part of the Community

Speaker: Matthew Kiernan
Partner, Peat Marwick Stevenson and Kellogg, Winnipeg, Canada

Sustainable urban development has both tangible and intangible dimensions. The tangible dimension is physical/environmental while the intangible involves the following:

- overall quality and quantity of urban economic development;
- social justice and distributional equity;
- quality and availability of training, or ability to generate and regenerate human resources;
- quality of urban government;
- quality of urban management, specifically, an accessible administration which gives the general public opportunities for participation and empowerment.

From World War II to the 1980s Canadian suburbs prospered physically, socially and economically at the expense of the city centre. However, a new appreciation of cost, congestion, commuter-time and energy issues helped to place the emphasis back on the inner city. The following three initiatives explicitly attempted to reverse the earlier trend by using

shelter as the economic and social engine to drive a sustainable urban community. The Canada Mortgage and Housing Corporation was a key player in all three projects.

a) The Toronto St. Lawrence Neighbourhood Project was an attempt at social engineering through architecture. The goal was to create a new community of mixed incomes on a derelict site in downtown Toronto. The cooperative effort between the City of Toronto and the federal government was successful and produced very high urban design standards.

b) Operation 20,000, in Montreal, targeted the building of 20,000 new inner-city homes over an eight-year period. Inner-city neighbourhoods were stabilized through the construction of new homes. The project demonstrated to the private sector that money could be made from inner-city housing.

c) The Winnipeg Core Area Initiative was a very broad project of which housing was but one component. Over a five year period, the Core Area Initiative increased the supply of housing for the city area. Community groups played a major role in raising the area's level of services and the quality of life. The Winnipeg Core Area Initiative represented a successful partnership among the three levels of government as well as between the public and private sectors.

The future of sustainable development will be influenced by a number of factors:

- Cities will become more dominant economically, socially and politically
- The acceleration of global international capital markets will pour offshore investment money into Canadian cities.
- Governments will supersede the private sector as a principal catalyst of major urban development and change. (The public sector has the necessary tools to do this.)
- The impoverishment of government at each level will lead to more intergovernmental partnerships.
- The private sector will become a key player in sustainable development as there will be more public/private partnerships.
- The onus will be placed on the local government to be more active in sustainable development.
- The public will demand more attention to social issues.

Policies must be developed to respond to these influences.

Sri Lanka: The Million Houses Programme and the Environment

Speaker: Locana Gunaratna

Advisor, Million Houses Programme, Sri Lanka

Sri Lanka's Million Houses Programme (MHP) evolved from an evaluation of its predecessor, the 100,000 Houses Programme (HTHP). This earlier project encouraged firms of consultants, contractors and developers to participate in government house building programs. Although the goal of building 100,000 homes over a five-year period was achieved, the program was criticized because of cost overruns, arbitrary project parameters and building in environmentally sensitive areas.

The resultant review of the HTHP concluded that greater public participation was warranted. The review recommended that the state withdraw from direct participation in house construction. Instead it should support and encourage the process by which people build houses for themselves. The idea was that the government would support one million or more families in their efforts to upgrade or build shelter.

The Million Houses Programme is a sustainable strategy so long as it is reinforced by a strong national urban policy to protect the environment. This would include land use planning which distinguishes between land for human settlements, agriculture and forestry.

In 1985, a government-appointed commission endorsed the development of a large number of smaller towns rather than a small number of larger ones. The Land Commission's key recommendations on urban land clearly rejected the environmentally harsh "growth centre" strategies so popular in the West during the 1950s and 1960s. Instead the Commission preferred a symbiotic interdependence between urban areas and their rural hinterlands. If the MHP-type national shelter policy were pursued in tandem with such a national urban policy, the result would be a development model which is friendly to the environment and sustainable in the long term.

Tucson Solar Village, Open Planning

Speaker: Wilson Orr

Project Manager, Tucson Solar Village, Tucson, U.S.A.

The Tucson Solar Village is a plan to build a more sustainable community. As a relatively new project, the Tucson Solar Village is another three to four years away from construction. Activities to date have focused on planning and funding. However, even in its initial conceptualization , the Tucson Solar Village has two important lessons for community planning.

First, the Tucson solar Village incorporates environmental, economic and social factors into its planning and development. For example, the plan for the Tucson Solar Village addressed

air pollution by attempting to minimize the use of the automobile. This is achieved by adopting a land development approach which integrates employment into residential areas. Such a development approach encourages the residents to use less polluting modes of transportation such as walking, cycling and mass transit.

Second, the open planning process of the Tucson project encourages a constant dialogue between the public and private builders in a cooperative planning environment. This process enables each participant to become aware of the other's needs, objections and concerns. The experience so far has shown that citizen groups, builders and developers need an open planning process in order to develop and foster a community by and for the people.

SESSION 5

ENVIRONMENTALLY SENSITIVE DECISION MAKING

Session Chair: Debra Darke

Manager, Centre for Future Studies in Housing and Living Conditions, Canada Mortgage and Housing Corporation, Ottawa, Canada

This session examined the process by which environmentally sensitive decisions are made. Following the keynote address, a panel of senior government, environmental and industry representatives discussed the techniques, technologies and strategies used to implement environmentally sound urban management.

How Decisions Should Be Made and Who Should Make Them

Speaker: David Balsillie

Ontario Ministry of the Environment

Attitudes among corporate decision makers must change in order to maintain our world's delicate ecological balance. Governments must set rules to change economic activities which are environmentally unsound. Fortunately, some change has begun. A sign of this is the participation by business groups and municipal governments at round table discussions with the

provincial and national levels. These discussions are dedicated to the reconciliation of economic aspirations and environmental reality.

Governments must induce, through enforcement and encouragement, sound environmental practices by private industry. Encouragement may prove the better method to pursue in the long term as it develops tools to fight the war on pollution by drawing on private industry expertise. The Ontario government, for example, will spend $30 million over five years to stimulate new products and processes that protect the environment. Furthermore Ontario's Environmental Technology Programs will fund up to 50% of a project, up to a maximum $500,000 per year, to cover the cost of researching and demonstrating new environmental technology.

In addition to private industry inducements, the Ontario government has developed specific environment programs. One example is the development of the Ontario Government Program for Environmental Reform. This program has three elements: the Municipal Industrial Strategy Abatement Program (MISA), or the Government Waterways Cleanup Program, the Countdown Acid Rain Program and the three R's Management Waste Program.

MISA's objective is to eliminate persistent toxic discharges to waterways by stopping toxic chemicals at the source. This program looks at ways to improve the efficiency of technological processes of industry and thereby eliminate waste

production. The Ontario Countdown Acid Rain Program sets an abatement timetable for the four major sources of acid rain pollution and puts the responsibility on industry to end the pollution. The three R's Management Waste Program involves reduction, reuse, and recycling. The money set aside by the Ontario government for the municipal three R's program has increased steadily from less than $1 million in 1985, to more than $13.7 in 1990, to a projected $25 million in 1991. Recycling efforts have also come from private sector organizations such as Ontario Multi Material Recycling Incorporated (OMMRI). The soft drink industry has invested $20 million in OMMRI for recycling. In turn OMMRI has pledged $45 million to support three-R solutions to waste problems.

Industry must operate in a way which does not burden the environment. Future prosperity depends on the ability of business interests to respond positively to environmental problems.

SUBSESSION 1

Federal Perspective

Speaker: Raymond Robinson
Executive Director, Federal Environmental Assessment Review Office, Government of Canada, Hull, Canada

Government decision making must ensure that those affected by the decision have a fair opportunity to express their concerns and that authorities respond to these concerns in a clear and sensitive way. One area that requires special attention is the environment. New legislation to address the issue of environmental impact assessment is currently being drafted at the federal level, with some activity also occurring at the provincial level.

The Environmental Assessment Act in Ontario gave rise to the Environmental Assessment Board, a regulatory board with quasi-judicial powers. However, this Board was perceived as too burdensome and too time-consuming to be effective.

At the federal level, the Canadian government established the federal Environmental Assessment and Review Process (EARP). EARP is based on self assessment, that is departments are expected to assess and judge their program proposals in accordance with their own screening processes. When a

department decides that one of its projects could have potentially significant environmental impacts, it must refer the proposal to the environment minister. This is followed by a review conducted through an independent environmental assessment panel composed of members outside the federal government. However, the integration of environmental concerns into the planning and decision making process of federal government departments was inconsistent. Some departments did so successfully, others did not. Greater authority was needed at the federal level to ensure the integration of the environment and economy.

At both levels of government there is a lack of a clear vision of how to integrate environmental, economic and other factors into specific policy. The federal experience found the integration within the decision-making process was inconsistent due to the absence of an external pressure on the government. Therefore, the goal is to achieve a balance between the power external to policy development to insist upon certain environmental norms and the desirability of incorporating these concerns into the planning process.

Decision making from a Non-government Organization Perspective

Speaker: Shimwaayi Muntemba

Executive Director, Environmental Liaison Centre International, Nairobi, Kenya

Truly successful environmental policies must reflect the trans-boundary nature of environmental issues and the concerns of the citizens. At the local level, community groups must be involved in decisions pertaining to sustainable development, and at the national level, governments must advocate for and ensure the accurate representation of the trans-boundary nature of environmental and developmental problems.

At the federal level decision making must reflect the perspective of the people. Citizens play a role in environmental protection and therefore should be able to express their experiences and concerns. But mechanisms are needed to allow citizens to challenge national policies which do not reflect their concerns. The Environmental Liaison Centre International communicates with the government via the United Nations Environment Program (UNEP). UNEP provides the link between the government and the people to influence government thinking in policy areas with implications for the environment.

One area which has been devoid of public participation is policy on technology. The environment is very location-specific, and technology must respond accordingly. Unfortunately, local governments have tended to brush aside technology developed locally in favour of that developed in other regions. The displacement of local economies has been the result. It is far better to encourage technologies that people have developed within their own communities. The key is not technological transfer, but strengthening local development by allowing the grassroots help decide what technology a country should develop and adopt.

Role of Business

Speaker: Tim Page

Senior Vice-President, Focus 2000 Project, Canadian Chamber of Commerce, Ottawa, Ontario

Businesses realize that caring for the environment offers some business opportunities. However, there is an inherent contradiction between business and environmental interests. This was underlined in a statement from the Brundtland Commission which recognizes businesses as a prime source of environment degradation, but also a source of goods and employment. Part of the problem for businesses is the lack of established guidelines to help businesses manage the environment within a corporate structure.

The sheer complexity of environmental issues requires new forms of expertise and resources which many small businesses lack. The roadblocks that stand in the way of businesses and their desire for sustainable practices include: lack management tools and principles to office practices; and lack of a timely information base.

The Canadian Chamber of Commerce has responded positively to these challenges. Initiatives include resolutions by Chamber members to meet all government regulations and to ensure that environmental hazards associated with each industry are identified, studied and managed. The Chamber is committed to improving understanding of environmental issues by the 170,000 member firms. For example, a nation-wide electronic communication network and database links the National Chamber with all local chambers across the country. The network includes listings of environmental legislation and regulations, research and development efforts and international trends. By working together and with other groups, the Chamber provides practical tools that allow businesses to sustain a healthy environment.

Business decisions which are good for the environment and good for business require timely information. The Canadian Chamber of Commerce is promoting change by providing the tools and information to create it. In so doing, the Chamber reflects the new attitude about the environment taking hold in the business community.

SUBSESSION 2

Environmental Planning and Auditing: Lessons From Thailand

Speaker: Surin Setamanit

Professor, Faculty of Engineering and The Institute of Environmental Research, Shulalongkorn University, Bangkok, Thailand

Public participation in development decision making is both vital and inevitable. It is better to incorporate the community into planning, than to exclude this important perspective. It is, in fact, risky to underestimate public power and knowledge, as a case study of Thailand illustrates.

Thailand's administrative structure has not been conducive to open public involvement in planning or decision making. This has resulted in a number of confrontations between the public, government and development companies regarding the development of natural resources and industries. In the case of an offshore mining plan in Phuket, public outcry was enough not only to halt the development plan, but also to put the mining company out of business.

Three separate development projects illustrate how environmental considerations have been integrated into the planning, auditing and operational portions of projects at different stages and with different resources. First, the

planning of development around Lake Songkhla involved three economic/environmental considerations: 1) national resources; 2) social-economic issues; 3) environmental management. In each case planning was done in a coordinated way with constant dialogue among the three sectors.

In the second project, the Eastern Seaboard Industrial Development Projects, an environment management plan was initiated in the latter stages of the development when the consultants decided to produce a multi-centre development zone. An environmental impact investigation was conducted for the area and an environmental management plan proposed. In this case, the environmental activities were add-on projects.

In the final example, a hydro-power dam was constructed without a prior environmental impact assessment. However, at the completion of the project the electricity-generating authority of Thailand realized the need for some sort of environmental investigation. A post-environment examination, or environmental and ecological reconnaissance, was conducted. This proved quite informative about the current condition of the lake on which the dam is situated and the mitigation measures that will be required once the dam is operating.

Integrated Energy and Environmental Planning at the Municipal Level

Speaker: Ole Bjorkqvist

Department of Energy Conversion, Chalmers University of Technology, Goteborg, Sweden.

Energy demands in society are numerous and include demands for housing, services, industrial goods and transportation. In Uppsala, Sweden, a model was developed to demonstrate to decision makers the benefits and costs of various approaches to energy management and how they can be integrated into more environmentally conscious decisions.

The major questions posed by the Uppsala model involved the environmental effects and economic considerations of energy systems. The study emphasized how to satisfy energy demands with technical energy systems and specified a menu of energy technology describing the energy flows. The technical solutions require a restriction of fuel emissions and are also designed to address the objectives of the community. These objectives normally involve minimizing the cost of the system and balancing the supply technology with conservation to achieve an efficient mix of fuels in the system.

A step-by-step review of the model reveals, first and foremost, that it is very important to demonstrate to the decision makers

what is possible and what is not regarding the energy environment system. Second, the model shows the economic costs of decisions, specifically, how much it would cost to maximize the conservation of energy in Uppsala and the effects on energy consumption and emissions. Third, the model reduces the number of decisions required by focusing on only those issues which are important from an energy systems point of view. Fourth, this study underscores the need to work together with decision makers.

Above all else, the Uppsala case study demonstrated the important role of decision makers. However, just as important is the quality and availability of information to the decision maker.

Environmental Review Designs of an Advanced Technology Laboratory: Principles and Practice

Speaker: Ann C. Smith
Manager, Surveillance, Corporate Health, Safety and Environmental Sciences, Allied-Signal Inc., Morristown, U.S.A.

Plans to replace antiquated laboratory facilities with state-of-the-art materials in new laboratory buildings met with initial trepidations from the community. Allied Signal

Incorporated developed a health, safety and environmental review process to minimize the impact of an advanced laboratory on the surrounding community and allay any fears that a community may have. Integral to this process is the community input which was received before the planning approval to build the new laboratories.

The environmental review process employed was designed to foster communication between the community and the planners for the new laboratory buildings. Information sharing was central to this objective. Details on air quality and waste and waste water discharges were collected by interviewing laboratory directors and through physical observation, reviewing purchase orders and taking inventory of what was located on the premises. A review team then met with the community to inform the public of the findings while simultaneously compiling a list of community concerns. Attempts were then made to mitigate the concerns raised at the meetings.

The review process continued with a Surveillance Program. This is a systematic review process of the impact of the laboratory on the surrounding community. Fifty environmental audits per year are conducted under this program. The Program involves a rigorous evaluation of 1.5 years of records. Corrective action plans in accordance with the findings are recommended with a follow-up review to ensure compliance.

Furthermore, the Tier System was applied to the advanced laboratory. With the Tier System, every aspect of the laboratory was described and evaluated by health/ safety/ environment people, anticipating all failure modes, effects and feedbacks. Corrections and improvements are then recommended according to the findings.

In summary, the design review process of the laboratory incorporated the following five traits:

- coverage of all aspects related to the laboratory;
- open communication with all involved;
- adequate systems to control environmental concerns;
- feedback to correct deficiencies;
- flexibility and adaptability.

The new laboratory buildings show that business and community can be effective partners as long as the partnership is initiated before a project begins.

SESSION 6

SUSTAINABLE DEVELOPMENT AND THE URBAN FUTURE

Session Chair: Richard Gilbert

Metropolitan Councillor, The Municipality of Metropolitan Toronto.

Chairman, Standing Committee on Environmental Issues, Federation of Canadian Municipalities.

The Urban Development wrap-up session consolidated the practical solutions presented in both streams and identified the opportunities for creating urban areas that considers the needs of both the environment and its inhabitants.

Speaker: Robert Jarvis

Chairman, Canada Mortgage and Housing, Ottawa, Canada

To achieve sustainable development, we must ensure that development and re-development projects use less energy and are less resource intensive than they have been until now. We must produce project areas that are liveable and that allow for leisure and recreation. This is possible if economic growth provides equitable opportunities for present and future populations. Diverse social groups must have the opportunity

to participate in the improvement of their own communities and their status.

These requisites can only be achieved via a multi-stakeholder approach to decision making in a new era of municipal decision making and action. A multi-stakeholder approach should involve all levels of government, industry and the public. This is needed to make sustainable development a reality rather than mere rhetoric. The urban development stream attempted to answer two questions, "Do we have the skills and patience to translate these ideas into reality?" and "Is it worth doing?"

Speaker: Colin Isaacs
Environmental Consultant, Stoney Creek, Canada.

A review of the speeches from each session shows the interweaving of nine principles of sustainable development. The overwhelming conclusion from the urban development stream was that sustainable development is a grassroots phenomenon. It is the people who will ultimately solve environmental problems. In this sense, local solutions are important. Local organizations are essential in that they can facilitate the understanding of the problems, identify opportunities and develop strategies to take advantage of these opportunities.

Many speakers identified transportation, particularly the automobile, as a problem needing major solutions immediately.

Urban planning was also identified as an area requiring immediate change. Speakers pointed out opportunities for business to improve water supplies, sewage treatment methods, transit vehicles and more environmentally benign modes of transport.

A related and broader principle was the interaction of the economy with the environment. Major changes are essential to overcome environmental problems. Tax and commodity pricing reforms and the elimination of poverty must become priorities. However, addressing only economic issues falls short of sustainable development since urban problems must also be linked with issues of social justice and public policy.

Finally, the sessions unanimously endorsed the Brundtland definition of sustainable development: development which meets the needs of the present without compromising the ability of future generations to meet their own needs.